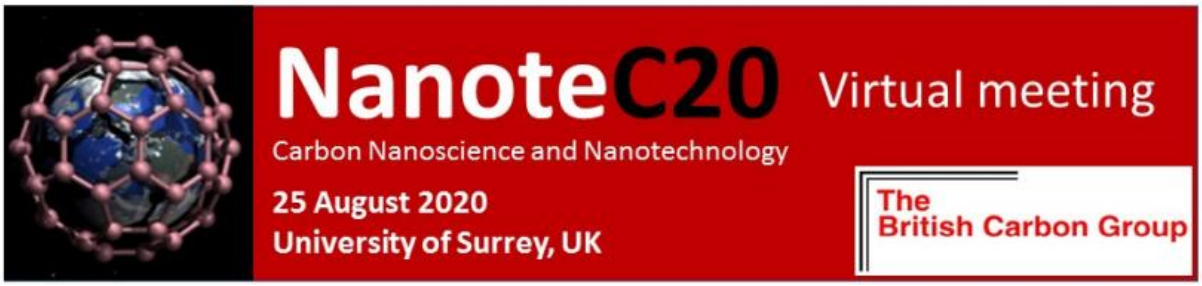

NanoteC is one of the longest running series of international nanoscale carbon conferences in Europe (since 1998). It brings together scientists working with nanoscale carbon materials: nanotubes, graphene, diamond- and fullerene-related nanostructures. While each of these materials attracts its own dedicated community of researchers, **NanoteC** draws on common themes and allows researchers to share insight into this unique element at the nanoscale.

Elemental carbon shows remarkable variety in properties via simple covalent bonding, however other systems (for example containing nitrogen or metals) are becoming important and provide alternative components with unique mechanical and electronic properties. Nanotechnology requires an understanding of these materials on an atomic level and this will be the central theme.

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Enjoy the Conference!!!

#7 - Carbon Nanomaterials as Nanocarriers for the Anticancer Drug Camptothecin

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Carbon nanomaterials are promising as drug nanocarriers suitable for medical treatments, due to their large surface area and chemical stability that allows efficient loading of drugs via both covalent and non-covalent interactions [1-3]. A combination of increased tumor vascular permeability and insufficient lymphatic drainage, resulting in what is termed as enhanced permeability and retention (EPR) effect, enables these nanomaterials to transport chemotherapeutic agents preferentially to tumor sites as compared to healthy tissues, thereby reducing toxic side effects [4]. Furthermore, these systems could be used for formulation of hydrophobic molecules which lack of suitable physicochemical characteristics required for development of stable pharmaceutical dosage form. Camptothecin (CPT) is a potent anticancer agent with topoisomerase I inhibiting activity whose practical use in viable cancer therapeutic systems is greatly hampered due to its high hydrophobicity and therefore low solubility in biological media [5]. The need to formulate water-soluble salts of CPT led to chemical modifications of the molecule with loss of anti-tumor activity [6,7]. Thus, developing new drug delivery nanocarriers for CPT able to transport and deliver the drug inside the cancer cells would be of high interest.

In this work, the potential in the field of CPT drug delivery for different nanocarriers such as carbon nanotubes (CNT), graphene oxide (GO), reduced graphene oxide (RGO) and carbon nanodiamonds (ND) were systematically compared under the same experimental conditions. *In vitro* studies were performed on human epithelial colorectal adenocarcinoma (Caco-2) cells and human breast adenocarcinoma (MCF-7) cells. Carbon nanomaterials able to establish strong π–π interactions with CPT provided the highest anticancer activity [8].

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